Measure: Mandatory C&D Recycling (G9)

Mandate a construction and demolition recycling diversion rate above the assumed local rate of 50% to one of the following:

- 80%
- 100%

Both mandate scenarios will be analyzed.

COT ARRA RFP Summary:

Emission reduction potential:	5,557 tCO_2e (100% diversion, 2020)
Percentage of goal (2012):	0.23%
Percentage of goal (2020):	0.25%
Total annual average implementation costs:	Not analyzed
Entity that bears the costs of implementation:	Developers
Cost/Savings per tCO_2e:	Not analyzed
Net annual savings:	Not analyzed
Entity that realizes the financial return:	Not analyzed
Equitability (progressive/regressive, income/revenue neutral, etc):	NA
Potential unintended consequences:	None identified

Background information:

Tucson construction and demolition (C&D) debris are currently diverted from one of the City's 25 landfills to recycling centers at an assumed rate of 50%.[1] [2] In the City of Tucson's fiscal year 2006-2007, nearly 1.65 million tons of municipal solid waste was generated.[3] C&D are assumed to make up 20% of the total waste stream based on EPA averages. The EPA estimates that approximately 25% of total solid waste is attributable to C&D.[4] Due to the significant reduction in local construction activity, WA assumes that waste streams from C&D activities have dropped to 50% of their 2006 values.

Tucson City Code 29 ARTICLE IX mandates landfill owners manage their landfill gas (LFG).[5] Methane from, for example, the Los Reales Landfill is piped over 3 miles to a co-fire power generation station resulting in enough energy to power 2,500 typical Tucson homes.[6] This power generation is offsetting either coal-based or gas-based power generation. Therefore, the exact science and math behind the emission reductions from any diversion of solid waste varies depending on the power source the methane is displacing. The upshot of Tucson's LFG management code is a lowering of, in most cases, emission reductions from an increase in waste recycling (there are some instances where the emissions actually rise depending on the type of debris).

Fortunately, the EPA has emission factors for different classes of debris based on how the waste disposed. The typical emission factor for C&D waste that is disposed of in a landfill with energy recovery (eg, LFG management) is 0.04 tCO_2e per short ton of waste.[7]

Description of Measure and Implementation Scenario:

The City of Tucson shall mandate a construction and demolition recycling diversion rate of 80% or 100% commencing in 2011. Both scenarios will be analyzed below.

Given the waste streams and assumptions reported above, WA projects total 2010 C&D debris for Tucson at just over 206,000 tons and a growth rate of 3% annually. It is very likely that the diversion rate for this waste is already near 50%, leaving the mandate to cover the balance.

Business As Usual:

As stated above, business as usual for C&D recycling in the Tucson area is assumed to be 50%. Under a business as usual scenario, management of C&D waste streams will continue to hold at approximately 50% through 2020.

Has the Measure been implemented elsewhere and with what results?:

The California government has a useful website, CalRecycle, that specifically addresses construction and demolition debris recycling, including a tools section for local governments.[8] The first step in the local government guide is to "know your waste stream."

The City of Dublin, CA requires a C&D waste bond be posted prior to commencement of any project over $100,000. The bond amount is based on the estimated amount of waste to be generated and mandates that 100% of asphalt and concrete and 50% of all other waste generated is recycled.[9]

Energy/Emission analysis:

Starting with a C&D waste stream of over 206,000 tons in 2010 and increasing at 3% per year, the 2020 C&D total debris tonnage is nearly 278,000. The waste diverted with an 80% mandate, assuming 50% is already being recycled, is over 83,000 tons. With a 100% diversion mandate, the total tonnage being recycled in 2020 is projected to be nearly 139,000. The typical emission factor for C&D waste stream materials is 0.04.

Contribution analysis:		
COT 1990 Citywide GHG emissions (baseline):[10]	5,461,020	tCO_2e
MCPA 7% reduction target for COT:	5,078,749	
2012 BAU GHG emissions projection:	7,000,000	
2020 BAU GHG emissions projection:	7,343,141	
GHG emissions reduction to meet 7% goal (2012):	1,921,251	
GHG emissions reduction to meet 7% goal (2020):	2,264,392	
Mandatory C&D Recycling- 80% Mandate		
Contribution of G9 Mandatory C&D Recycling (in 2020 assuming 80% mandate):	3,334	tCO_2e
2020 Contribution of G9 Mandatory C&D Recycling (assuming 80% mandate):	0.15	%
Mandatory C&D Recycling- 100% Mandate		
Contribution of G9 Mandatory C&D Recycling (in 2020 assuming 100% mandate):	5,557	tCO_2e
2020 Contribution of G9 Mandatory C&D Recycling (assuming 100% mandate):	0.25	%

Economic analysis:

At the privately owned Speedway Recycling and Landfill Facility, owned by Fairfax Companies, the costs per ton of construction debris and that of recyclables are the same (currently $28 / ton).[11] Therefore, additional cost per tCO_2e is $0.00.

- ***Cost*** per tCO_2e = ***$ 0.00 / tCO_2e***

The barrier to C&D diversion rates increasing from the above industry norm of 50% more than likely has to do aversion to job-site sorting.

Co-benefits:

The EPA has listed other benefits of recycling that is applicable to C&D waste:

- Reducing pollution and conserving natural resources.
- Saving energy by reducing the need to extract and process “virgin” raw materials to manufacture new products.
- Stimulating the development of greener technologies.
- Avoiding the cost and land of waste disposal in landfills and incinerators.

This analysis doesn’t assume that the mandate reduces the amount of virgin materials used on the projects that create the waste stream. However, the conservation of natural resources and energy associated with virgin materials are those upstream from the waste diverted as a result of the analyzed mandates.

Equitability:

There are no apparent equitability issues.

Potential unintended consequences:

None identified.

General Note: All references retrieved October through December of 2010 unless otherwise noted.

Endnotes:

[1] The assumed diversion rate of 50% was obtained from information contained on the City of Tucson Measure Matrix transmitted to Westmoreland Associates October 1, 2010.
[2] The 50% diversion rate is consistent with national averages: http://www.epa.gov/epawaste/conserve/rrr/imr/cdm/pubs/cd-meas.pdf
[3] This includes the Office of Conservation and Sustainable Development's data: http://www.tucsonaz.gov/ocsd/docs/CMS1_032885.pdf and an additional 50,000 tons for inert C&D waste disposal that was excluded from the research. For the 50,000 tons, the data can be found at: http://www.pagnet.org/documents/Water/PC208/Ch6_Apr06.pdf.
[4] http://www.wbdg.org/resources/cwmgmt.php
[5] http://cms3.tucsonaz.gov/sites/default/files/esd/landfillord.pdf
[6] http://www.tucsonelectric.com/Green/Services/methanegas.asp
[7] http://www.epa.gov/climatechange/wycd/waste/measureghg.html
[8] (www.calrecycle.ca.gov/Condemo/Tools)
[9] http://ca-dublin.civicplus.com/index.aspx?NID=661
[10] PAG Regional Greenhouse Gas Inventory- 2010
[11] http://www.thefairfaxcompanies.com/includes/pdfs/Fairfax_Brochure.pdf